

Name Key

Date \_\_\_\_\_

**1.6, 3.5, 3.6 Quest – Coordinate Plane**  
**STUDY GUIDE --- QUEST WILL BE 43 POINTS**

**FORMULAS:**

<b>Distance Formula:</b> $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	<b>Midpoint Formula:</b> $M\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$
<b>Slope Formula:</b> $m = \frac{y_2 - y_1}{x_2 - x_1}$	<b>Slope-Intercept Form:</b> $y = mx + b$
<b>Point-Slope Form:</b> $(y - y_1) = m(x - x_1)$	

**FINDING THE DISTANCE OF A SEGMENT AND THE COORDINATES OF THE MIDPOINT.**

Answer the questions in the space provided. Circle your final answer. (3 points each).

1. Find  $ST$ .

$S(-5, 9) \quad T(9, -3)$

$$ST = \sqrt{(-5 - 9)^2 + (9 - (-3))^2}$$

$$= \sqrt{(-14)^2 + 12^2}$$

$$= \sqrt{196 + 144} = \sqrt{340} \approx 18.44$$

2. Find the coordinates of the midpoint of  $\overline{ST}$ .

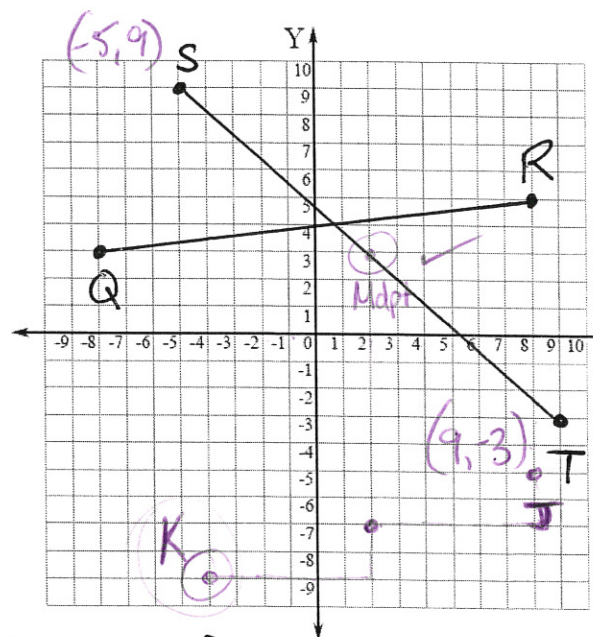
Midpoint  $\left(\frac{-5+9}{2}, \frac{9+(-3)}{2}\right)$

$$\left(\frac{4}{2}, \frac{6}{2}\right) \Rightarrow (2, 3) \checkmark$$

3. M is the midpoint of  $\overline{JK}$ . J has coordinates  $(8, -5)$ , and M has coordinates  $(2, -7)$ . Find the coordinates of K.

(HINT: USE THE COORDINATE PLANE TO GRAPH THE POINTS.)

$K(-4, -9)$



Check:

$$-6 < \begin{matrix} (8, -5) \\ (2, -7) \end{matrix} > -2 \checkmark$$

$$-6 < \begin{matrix} (2, -7) \\ (-4, -9) \end{matrix} > -2$$

**CALCULATING SLOPE.**

For #4-#5, find the slopes of the lines in the coordinate plane. Circle your answers. For #6-#7, identify the relationships between the indicated lines. (2 points each.)

4.  $\overline{YZ}$   $\frac{-14}{+6} = \frac{-7}{3}$

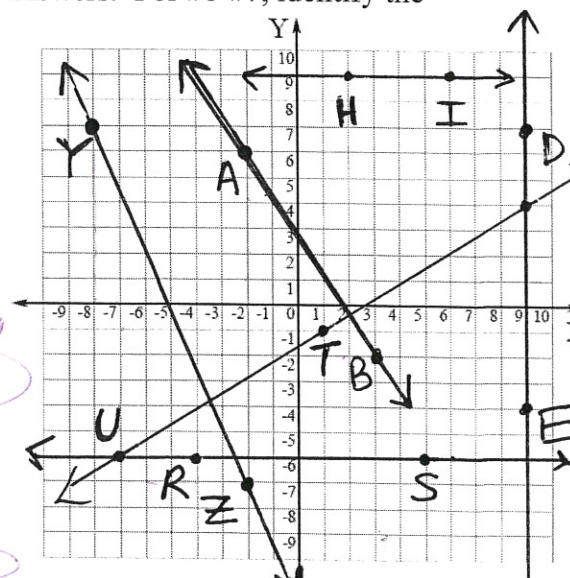
5.  $\overline{DE}$  Undefined Slope  
 $\Rightarrow$  vertical line

6. Identify  $\overline{AB}$  and  $\overline{TU}$  as parallel, perpendicular or neither. "opposite reciprocal"

$\overline{AB} \ m = -\frac{8}{5} \quad \overline{TU} \ m = +\frac{5}{8}$  So Perpendicular

7. Identify  $\overline{HI}$  and  $\overline{RS}$  as parallel, perpendicular or neither.

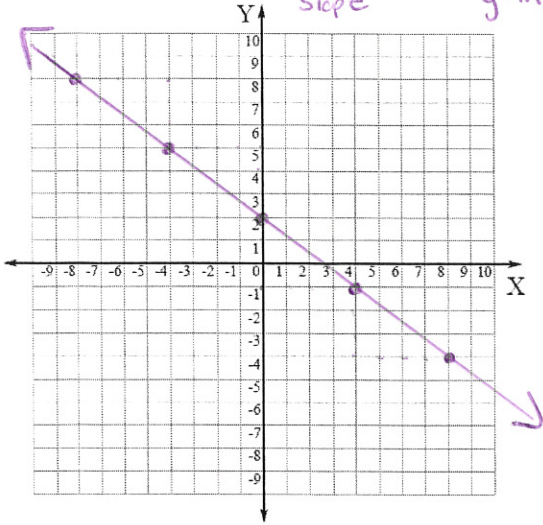
2 Horizontal line, slope are both zero  
 Same slope  $\Rightarrow$  Parallel lines



# GRAPHING LINES AND WRITING THE EQUATION OF A LINE IN SLOPE-INTERCEPT FORM.

Answer the questions in the space provided. Circle your final answer.

8. (2 points) Graph:  $y = -\frac{3}{4}x + 2$
- Slope*  $\swarrow$   $\searrow$  *y-int*



9. (2 points) Write the equation of the line passing thru  $(-4, 5)$  with a slope of 3.
- $(x_1, y_1)$   $m=3$

$$y - y_1 = m(x - x_1)$$

$$y - 5 = 3(x + 4)$$

$$y - 5 = 3x + 12$$

$+5$   $+5$

$$y = 3x + 17$$

10. (3 points) Write the equation of a line passing thru the points  $(-4, -5)$  and  $(-6, -3)$ .

$$m = \frac{-3 - (-5)}{-6 - (-4)} = \frac{2}{-2} = -1$$

$$y + 5 = -1(x + 4)$$

$$y + 5 = -x - 4$$

$-5$   $-5$

$$y = -x - 9$$

$$y = -x - 9$$

## APPLICATIONS.

A map of an amusement park is shown on a coordinate plane, where each square of the grid represent 1 square meter. The concession stand is at  $(-11, 14)$ , the Merry-Go-Round is at  $(16, -5)$ , and the Ferris wheel is at  $(-3, 15)$ . Find each distance to the nearest tenth of a meter.

11. The Fortune Teller is at the midpoint between the Merry-Go-Round and the Ferris wheel.

What is the distance from the Fortune Teller to the Ferris wheel? (3 points).

Fortune Teller  $\left(\frac{16 + (-3)}{2}, \frac{-5 + 15}{2}\right)$

$\left(\frac{13}{2}, \frac{10}{2}\right) \Rightarrow (7.5, 5)$

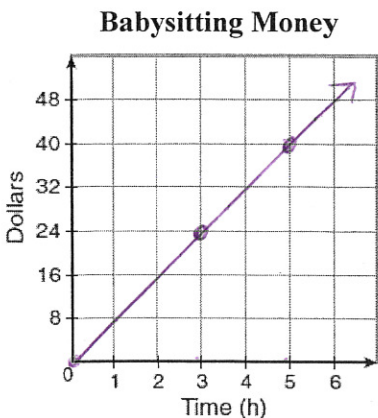
$(16, -5)$   $(-3, 15)$

Teller to Ferris =  $\sqrt{(7.5 - (-3))^2 + (5 - 15)^2}$

$(7.5, 5)$   $(-3, 15)$

$$\sqrt{10.5^2 + (-10)^2} = \sqrt{110.25 + 100} = \sqrt{210.25} \approx 14.5$$

12. Jackie earns money babysitting on Saturdays. She starts at noon. By 3:00 pm, she has earned \$24. At 5:00pm, Kyle has earned \$40. Graph a line to show Jackie's earnings and find the slope of the line to tell how many dollars she earns per hour. (3 points).



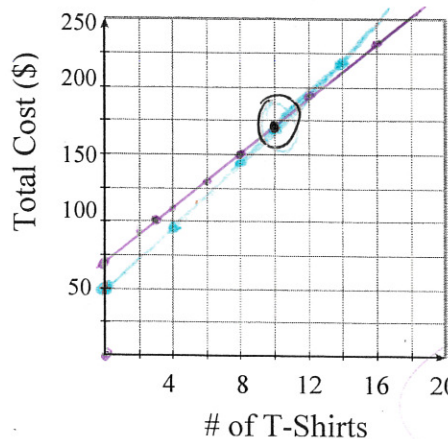
$$\frac{40 - 24}{5 - 3} = \frac{16}{2} = 8$$

$$= \$8/\text{hr}$$

$$\$8 \text{ per hour}$$

13. Ms. Williams is planning to buy T-shirts for the cheerleading camp that she is running. After buying how many T-shirts would both companies' total costs be the same? (3 points).

	Art Creation Fee	Cost per T-shirt
Company A	\$70	\$10
Company B	\$50	\$12



$$y = 10x + 70$$

$$y = 12x + 50$$

$$10x + 70 = 12x + 50$$

$$20 = 2x$$

$$10 = x$$

After 10 shirts both costs would be \$170.